

Maine Clean Air Zone Projects

(Service Learning Opportunities)

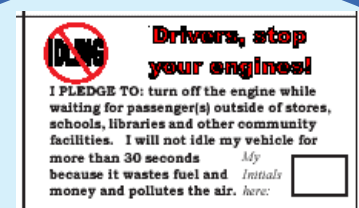
Partners:

- *Community Volunteers
- *School Eco-Teams
- *Maine DEP-Air Bureau
- *American Lung Association
- *Council of Churches
- *Sierra Club-Cool Cities Team

COMMUNICATION TOOLS:



Magnets



Pledge Cards



Decals & Signs

Ask about our free
Gallery Walk Challenge,
Teaching Resources and
Communications Tools...

Effects of Common Air Pollutants

RESPIRATORY EFFECTS

Symptoms:

- Cough
- Wheezing
- Phlegm
- Shortness of breath
- Chest tightness

Increased sickness and premature death from:

- Asthma
- Bronchitis (acute or chronic)
- Emphysema
- Pneumonia

Development of new disease

- Chronic bronchitis
- Premature aging of the lungs

How Pollutants Cause Symptoms

Effects on Lung Function

- Narrowing of airways (bronchoconstriction)
- Decreased air flow

Airway Inflammation

- Influx of white blood cells
- Abnormal mucus production
- Fluid accumulation and swelling (edema)
- Death and shedding of cells that line airways

Increased Susceptibility to Respiratory Infection

Normal Lung with respiratory infection

CARDIOVASCULAR EFFECTS

Symptoms:

- Chest tightness
- Chest pain (angina)
- Palpitations
- Shortness of breath
- Unusual fatigue

Increased sickness and premature death from:

- Coronary artery disease
- Abnormal heart rhythms
- Congestive heart failure

How Pollutants May Cause Symptoms

Effects on Cardiovascular Function

- Low oxygenation of red blood cells
- Abnormal heart rhythms
- Altered autonomic nervous system control of the heart

Vascular Inflammation

- Increased risk of blood clot formation
- Narrowing of vessels (vasoconstriction)
- Increased risk of atherosclerotic plaque rupture

Normal Rupture-prone vulnerable plaque

Reduce your risk by using the Air Quality Index (AQI) to plan outdoor activities – www.airnow.gov

AQI Levels of Health Concern	AQI Values	What Action Should People Take?
Good	0-50	Enjoy Activities
Moderate	51-100	People unusually sensitive to air pollution: Plan strenuous outside activities when air quality is better
Unhealthy for Sensitive Groups	101-150	Sensitive Groups: Cut back or reschedule strenuous outside activities Particle Pollution: People with heart or lung disease (including diabetics), older adults, and children Ozone: Active children and adults and people with lung disease Sulfur Dioxide: Active children and adults with asthma Carbon Monoxide: People with heart disease and possibly fetuses and infants
Unhealthy	151-200	Everyone: Cut back or reschedule strenuous outside activities Sensitive groups: Avoid strenuous outside activities
Very Unhealthy	201-300	Everyone: Significantly cut back on outside physical activities Sensitive groups: Avoid all outside physical activities

Asthma & Diesel Exhaust

- Particles in air pollution can aggravate asthma & respiratory symptoms
- Children are sensitive to air pollution -- their lungs are developing and they have a faster breathing rate

Did you Know?



Children diagnosed with asthma doubled between 1983 and 1995.



13.2% of Maine children have been diagnosed with asthma. (1 in 5 households)

Asthma related absences each year in Maine:
65,000 lost school days
37,500 lost work days

A Community-based Social Marketing Initiative

Key Steps:

Conducting Research

Establishing Norms & Getting Commitment

Providing Prompts & Reminders

Raise public awareness of health and environmental impacts from idling vehicles then foster community stewardship behaviors.

“Stewardship behavior is most effectively achieved through initiatives delivered at the community level.”

Fostering Sustainable Behavior - Doug McKenzie Mohr & William Smith



Drivers, stop your engines!

For your family's health, you can start a local Clean Air Zone campaign; spreading the word neighbor to neighbor and identifying potential Clean Air Zones in your community. Call now (207-761-5616) to obtain a Clean Air Campaign - Tool Kit to get started.

The Benefits: Breathe Easier, Save Money, and Protect our Air and Health by turning off your vehicle whenever parked.

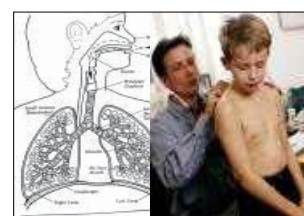


There are many good reasons not to idle.

- ♦ Idling causes pollution.
- ♦ Pollution can cause health problems.
- ♦ Idling wastes expensive fuel.
- ♦ Excessive idling can damage engine components.
- ♦ Conserving fuel promotes energy independence.

The Problem: Air Pollution & Our Health

In Maine, 13.2% of children suffer from asthma - that's the highest rate in New England.



Vehicle emissions contribute air toxics, as well as nitrogen oxides which react with sunlight to form ozone pollution.



Vehicle emissions can trigger asthma attacks and other respiratory and cardiovascular health effects.



Children are more sensitive to pollution; they breathe 50% more air per pound of body weight.



Vehicle or mobile sources contribute more than 50% of air pollution emissions in Maine.

Sponsors:



MAINE COUNCIL OF CHURCHES
Maine Clean Communities = MC²

Building Healthier Communities
Clean Air Zones Program



Idling Myths

Idling Myth No. 2 Idling is good for your engine.

Reality

Excessive idling can damage your engine components, including cylinders, spark plugs and the exhaust system.

Idling Myth No. 1 The engine should be warmed up before driving.

Reality

Idling is not an effective way to warm up your vehicle.
Driving your vehicle is the best way to warm it up.
30 seconds of warming up your vehicle is enough.

Idling Myth No. 3 Shutting off and restarting your vehicle is hard on the engine and it uses more gas.

Reality

Frequent restarting has little impact on engine components.
More than 10 seconds of idling uses more fuel than restarting the engine.

Why Idling Is a Problem

Idling our vehicles:

- produces unnecessary pollution that contributes to climate change, and jeopardizes our health.
- wastes fuel and costs us money;
- is *not* good for vehicle engines.

North Americans' Idling Habits

- Most idle 5-10 minutes a day.
- Many leave the car running unattended while on errands.

Some are using remote starters to warm their cars before going out doors.

It can be done . . . with the turn of a key.

Idling a vehicle for 5 minutes a day wastes about 13 gallons of gas a year.

Idling a medium duty gasoline vehicle for just 5 minutes each day can emit as much as 300 pounds of harmful pollutants in a year. (30 pounds which include toxic air pollutants, 280 pounds of greenhouse gases)



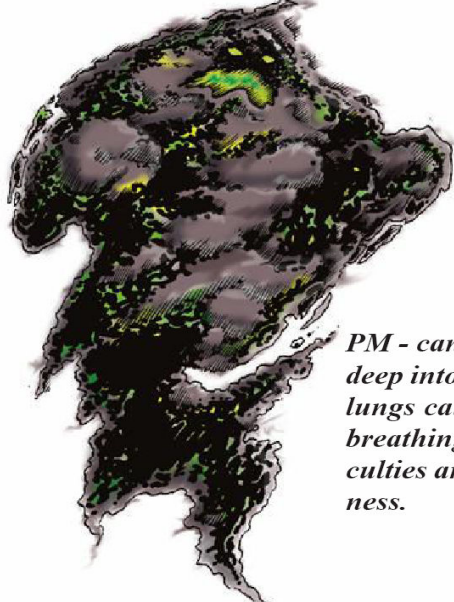
Idling Facts

Source: Natural Resources Canada, Idle Free Program

CAZ Classroom Teaching Tools help students learn all about Air Pollution

PM THE LURKING HULK

Particle Matter is very tiny "solids" from natural and manmade stuff that gets into the air such as dust, smoke, black carbon, etc.

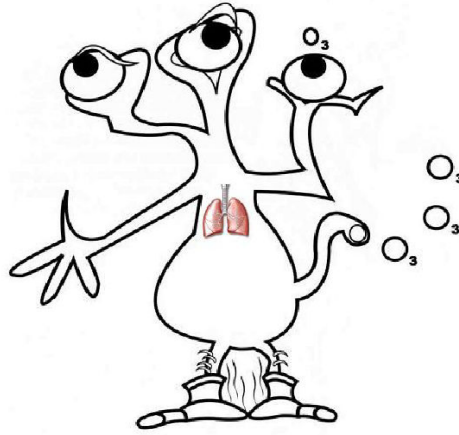


PM - can travel deep into the lungs causing breathing difficulties and sickness.

PARTICLE MATTER (PM)

O3 the OZONATOR

AIR MASSES COMING FROM THE SOUTHWEST CARRY POLLUTANTS (NOx and VOCs) AND ...ON HOT SUNNY DAYS - they chemically react to form O3..

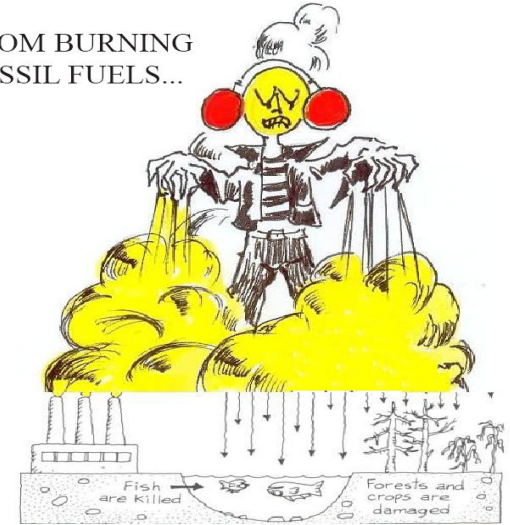


Ozone (O3) "burns" your lungs like a sun-burn and causes respiratory damage.

GROUND LEVEL OZONE

SO2 ACIDMAN

FROM BURNING FOSSIL FUELS...

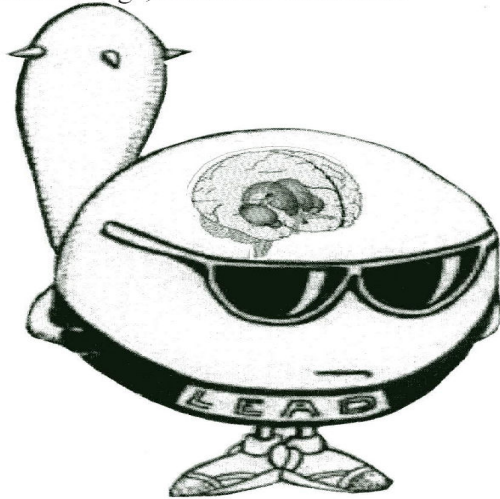


SO2 ACIDIFIES RAIN, WATER AND SOIL; KILLS FISH AND DAMAGES CROPS AND TREES.

SULFUR DIOXIDE

Pb the LEADHEAD

Lead from metal refining, old paint flaking from buildings, and some chemicals.

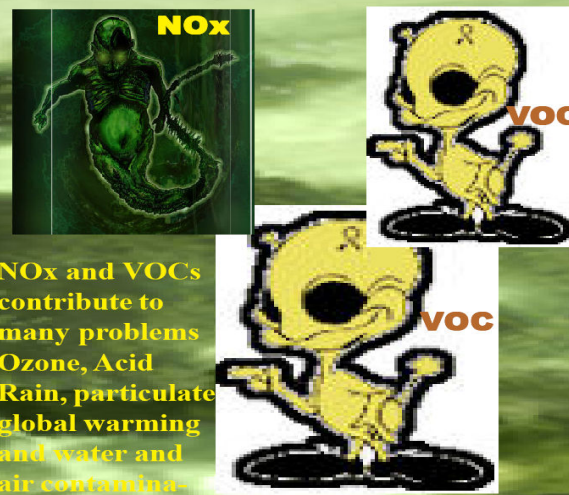


Can cause brain damage, lethargy and reduced mental sharpness - especially a problem with children's developing brains.

LEAD

The DYNAMIC CREEPY CRITTERS - NOx & VOCs

NOx from burning fuels and VOCs from evaporating chemicals get transported over long distances and form a chemical soup.

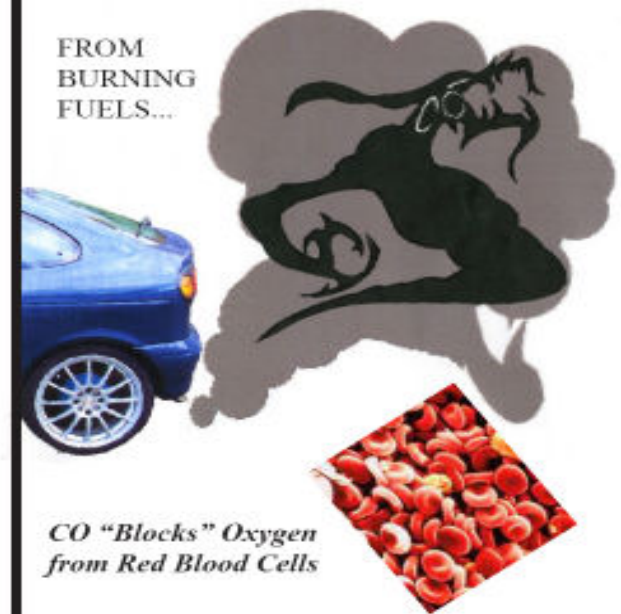


NOx and VOCs contribute to many problems: Ozone, Acid Rain, particulate global warming and water and air contamination.

Nitrogen Oxides and Volatile Organic Compounds

Gasper the CO Phantom

FROM BURNING FUELS...



CO "Blocks" Oxygen from Red Blood Cells

CARBON MONOXIDE

& its Health Effects

BODY MATH: All about Me & the Air I Breathe

My lungs breathe in fresh air to help my heart pump oxygen into my blood and through my body.



Body Math

1. Measure & Record

My age: _____
My height: _____ feet/inches
My weight: _____ pounds
My sex: girl or boy

(Body Math Points "A") My Body Size:
Small, Medium, Large
1pt. 2pts. 3pts.

Draw a picture of me here
(Draw in my lungs, heart and veins.)

2. How much air I can breathe:

Peak Flow ("PF")

(Use peak flow meter to measure how much air you can blow out fast.)

OR Total Volume ("TV")

(Take a very deep breath and blow up balloon with ALL the air in your lungs. Measure the circumference in inches or centimeters.)

How fast my heart beats:

resting pulse

working pulse

(Count pulse for 10 seconds before and after exercise.)

Record & Add Body Math Points here:

Breath Points (PF or TV) = _____

Body Size (A) _____ + Conditioning (B) _____ = _____ (C).

Make Group Graph: "C" vs "PF or TV" for all students in group/class.

Turn page over to compare and graph how much exercise we get, and how it can improve our body fitness.

"The lungs have an enormous surface area. Every day we breathe in 20,000 liters of air - compared to just a few liters of food and drink - we breathe in viruses, bacteria, tobacco, smoke and other particles in the air."*

BODY NUMBERS

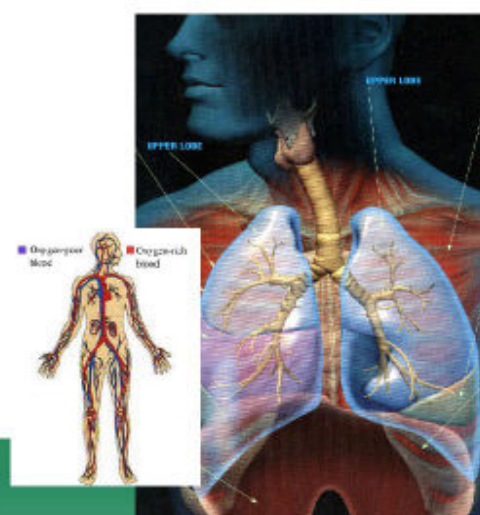


HOW MUCH AIR DO YOUR LUNGS HOLD?

Total Volume ("TV")
(Take a very deep breath and blow up a balloon with ALL the air in your lungs. Measure the circumference in inches or centimeters.)

You could also use a spirometer or special spirometry bag to get a Total Volume measurement in liters.

My lungs breathe in fresh air to provide oxygen for my heart to pump oxygen into my blood and through my body.



HOW MUCH AIR CAN YOU EXPEL FAST...PEAK FLOW?

"The long term effects of air pollution are loss of lung function and possible respiratory disease, but it can also cause heart problems."*

* "Clearing the Air", Jonathan Shaw, Harvard Magazine, 2005

WHAT VARIABLES AFFECT OUR LUNG & HEART HEALTH?

Conditioning, genetics, body size, gender, age, weight, other _____?

Peak Flow ("PF")
(Use a peak flow meter to measure how much air you can blow out fast.)

This is a measure of how healthy and conditioned your lungs and airways are. You can use this tool daily to keep track of respiratory changes, especially if you have asthma.

Body Conditioning I exercise:

(7-9pts.) _____ LOTS (I'm an athlete)
(4-6 pts.) _____ SOME (20 minutes; 2-3 times a week)
(1-3 pts.) _____ A LITTLE (not much) OR I've been sick lately)

How fast my heart beats:

resting pulse
working pulse
(Count pulse for 10 seconds before and after exercise - multiply x 6 to get the beats per minute.)

MEASURE & GRAPH THE DATA